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10/026,379	12/18/2001	Michael R. Sogard	PA0335-US/11269.34	1089

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The Law Office of Steven G. Roeder
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EXAMINER

SOUW, BERNARD E

ART UNIT

PAPER NUMBER

2881

DATE MAILED: 10/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/026,379

Applicant(s)

SOGARD, MICHAEL R.

Examiner

Bernard E Souw

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-143 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-143 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 April 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to because:

- (a) In Fig.1B, numerals 1900 and 1902 (recited in the specification on pg.6/ll.5-7 & 8-20) are missing. The specification recites that numerals 1900 and 1902 are illustrated in Fig. 19. However, Fig.19 as drawn, has no, or unclear relationship to Fig.1B.
- (b) In Fig.2, numeral 126 (recited in the specification on pg.9/l.21) is missing.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8, 10, 39, 41, 70, 72, 84, 86, 114 and 116 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are manifested in the claim recitation "*magnitude of the signal of the beamlet at the mask*". It is unclear how a signal can possibly be measured *at* the mask.

To proceed with this Office Action it is assumed by the Examiner that the signal of the beamlet is measured by the third detector 186 shown in Fig.1B and Figs.11A & 11B and Figs.12A & 12B, i.e., as electrons reflected by the mask 103A/B.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1, 6-15, 19, 22-30, 34, 38-42, 45-48, 77, 82, 83, 88-91, 95, 98-106, 113, 117 and 120-123 are rejected under 35 U.S.C. 102(a) and U.S.C. 102(e) as being anticipated by Nakasuji (USPAT 5,892,224).

4. Regarding claim 1, Nakasuji discloses in Col.20/ll.66-67 and Col.21/ll.1-16 an inspection system for inspecting a mask shown in Fig.11, the mask 75 including at least one actual transparent area 75b and at least one actual opaque area 75a, the inspection system comprising: a beamlet supply assembly 71 that directs a shaped beamlet(s) EB (or EB_n) towards one of the actual areas of *[the]* a mask 75, the shaped

beamlet(s) having a beamlet characteristic, shown in Fig.12 as recited in Col.21/ll.17-29, that corresponds to a desired characteristic of one of the desired areas comprised in 75, as denoted by the dashed rectangular and recited in Col.21/ll.3-13.

The remaining limitation of the preamble is inherent to the act of inspecting a mask, since a mask trivially has a pattern which inherently consists of at least one desired transparent area organized in a desired transparent pattern and at least one desired opaque area organized in a desired opaque pattern, as specifically recited in Col.21/ll.20-22, the word "desired" being thereby trivial, for being inherent in the act of "inspection", i.e., the mask being disqualified if found not desired.

5. Claim 77 is a method claim reciting limitations which are directly related to each of the limitations of claim 1. Claim 77 is therefore also rejected by the same token.

6. Regarding claims 11 and 87, Nakasuji's beamlet supply assembly 71 directs a plurality of spaced apart, shaped beamlets EB_n , simultaneously towards the mask 75, as is obvious in Fig.11 and specifically recited in Col.21/ll.5-17.

7. The limitations of claim 26 and claim 34 combined are covered by claims 1 and 11 combined. Claims 26 and 34 are therefore rejected along with claims 1 and 11.

8. Claim 102 is a method claim reciting limitations which are directly related to each of the limitations of claim 26. Claim 102 is therefore also rejected by the same token.

9. Claims 22-25, 45-48, 98-101 and 120-123 are various types of claims, such as product by process, apparatus for process and object for process claims, reciting limitations which are directly or indirectly dependent to, while being fully covered in its entirety without a single exception by the limitations of apparatus claims 1, 26 and method claims 77 and 102, respectively. Claims 22-25, 45-48, 98-101 and 120-123 are therefore rejected along with claims 11, 26, 77 and 102.

10. The limitations of claims 12-15, 27-30, 88-91 and 103-106 are inherent in the "plurality" limitation of previously rejected claims 11, 26, 87 and 102. Claims 12-15, 27-30, 88-91 and 103-106 are therefore rejected by the same token over the same prior arts as previously applied to claims 11, 26, 87 and 102.

11. Regarding claims 6 and 82, Nakasuji's electron beam apparatus inherently includes a source of electrons, as recited in Col.21/II.1-2.

12. Regarding claims 19, 42, 95 and 117, Nakasuji's beamlet shaper assembly 71 includes a beamlet shaper 71a that shapes the beamlet EB_n .

13. Regarding claims 7, 38, 83 and 113, Nakasuji's detection apparatus and method make use of a detector assembly 81+83 that measures the magnitude of the signal that

passes through at least a portion of the mask 75, as shown in Fig.11 and recited in Col.21/ll.25-67 and Col.22/ll.1-25.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 2-4, 35-37, 78-80 and 110-112 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakasuji.

Nakasuji discloses in Col.20/ll.66-67 and Col.21/ll.1-16 an inspection system for inspecting a mask shown in Fig.11, the shaped beamlets shown in Fig.12 and recited in Col.21/ll.17-29 have substantially the same shape (dashed rectangular and multiple array of smaller rectangles) as one of the desired areas, as recited in Col.21/ll.3-13, as already applied to claim 1 above. Although not expressly recited, Nakasuji's shaped beamlets also have the same cross-sectional size.

It would have been obvious to one of ordinary skill in the art at the time the invention was made not only to give the beamlets the same cross-sectional shape, but also the same cross-sectional size, since the latter would make the determination of mask defect more quantitative, and hence, more reliable.

The additional limitation of beamlet similarities to the cross-sectional size and shape of the transparent or opaque areas is a mere matter of design choice, since one

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of ordinary skill in the art would very well know that any mask defects would still make itself recognizable through differences in the detected signals (reflected, transmitted and/or scattered), no matter whether the beamlet is shaped according to the opaque area or the transparent area, or both.

16. Nakasuji recites all the limitations of claims 5 and 81, as previously applied to claim 4, except the recitation that the cross-sectional size and shape of the shaped beamlet is at least 50% to 90% of that of one of the desired areas. The very broad range from 50% and 90% as claimed clearly indicates that this range is uncritical, and hence, unpatentable.

17. Claims 5 and 81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakasuji.

Claims 5 and 81 recite similar limitations, that the cross-sectional size and shape of the shaped beamlet is at least approximately 50% and 90%, respectively, of the size and shape of one of the desired areas. The very broad range of the limitation is Applicant's own proof that the claimed range is not critical at all.

Although Nakasuji does not specifically recite the ratio of the cross-sectional size of the shaped beamlet in comparison to the desired area, one of ordinary skill in the art knows very well that the specific ratio is not critical, as long as the transmitted (and/or reflected) electron signal is sufficiently differentiated to distinguish between a defective

mask from a normal/intact mask. Consequently, claims 5 and 81 are unpatentable for being well known in the art.

18. Claims 16-18, 31-33, 92-94 and 107-109 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakasuji.

Nakasuji discloses in Col.20/ll.66-67 and Col.21/ll.1-16 an inspection system for inspecting a mask shown in Fig.11, the shaped beamlets shown in Fig.12 and recited in Col.21/ll.17-29 have substantially the same shape and cross-sectional size, as previously applied to claims 2-4, 35-37 and 110-112. However, Nakasuji does not recite the shaped beamlets having the same pattern.

It would have been obvious to one of ordinary skill in the art at the time the invention was made not only to give the beamlets the same shape and cross-sectional size, but also the same pattern, in the alternative or in combination, since these would make the determination of mask defect be more quantitative and accurate.

19. Claims 8-10, 39-41, 84-86 and 114-116 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakasuji in view of Muraki et al. (USPAT 5,929,454).

Nakasuji recites all the limitations of claims 8-10, as previously applied to claim 7, except the recitation that the magnitude of the signal of the beamlet ~~{at the mask}~~ reflected off of the mask is compared to that measured by the detector assembly.

Muraki et al. discloses an electron beam exposure system and method making use of the magnitude of signal reflected off of an object 5 shown in Fig.1 (here Muraki's

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object 5 is substituted by Nakasuji's mask), in which the reflected signal detected by electron detector 9 is compared to that measured by detector 10, as recited in Col.7/II.50-65.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to measure the electrons reflected off from Nakasuji's mask, as taught by Muraki et al., in addition to those measured by Nakasuji's detector assembly 81+83, since a comparison of the two signals would enhance the accuracy of detecting a mask defect.

One would have been motivated for using Muraki's reflected electron data to enhance the accuracy of Nakasuji's defect detection method, since it is generally well known in the art that the accuracy of a measurement can be enhanced by considering more independently measured data. This motivation is generally derived by common sense from general knowledge in the art, without a need to be taught by any prior art.

Note: Insofar as the Examiner can ascertain beyond the above § 112 rejection, claim 8 recites the same limitations as claim 10, and claim 39 recites the same limitations as claim 41.

20. Claims 20, 43, 44, 49, 67, 68, 96, 97, 118, 119 and 124 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakasuji in view of Kobinata and Muraki et al., and further in view of Itoh et al. (USPAT 5,438,207), or Shimura et al. (USPAT 4,524,277), or Yasaka et al. (JP-405090140A).

As previously applied to claims 1, 6, 11, 26, 77 and 82, Nakasuji's inspection system and method for inspecting a mask comprises a source of electrons. Regarding claim 49, Nakasuji's device comprises a stage supporting the mask, as shown by numeral 79 in Fig.11 and recited in Col.22/ll.3-7. Specifically regarding claim 124, Nakasuji's beamlet shaping section comprises a multi-aperture array having M rows and N columns, as shown in Fig.12 and recited in Col.21/ll.7-10.

Still regarding claim 124, Nakasuji's method comprises measuring electrons with a detector assembly 81+83 shown in Fig.11, as recited in Col.21/ll.47-65.

However, Nakasuji's device and method do not make use of a beamlet blanking section disposed between the beamlet shaping section and the mask. Kobinata discloses an mask inspecting device and method as shown in Fig.2 and recited in the title and Abstract. As recited in Col.5/ll.18-32 and Col.6/ll.33-38, Kobinata's device and method make use of a blanking aperture 15 shown in Fig.2 and Fig.3, disposed between the mask M and the electron source 11, the latter being modified by Nakasuji's beamlet shaping section 71. In addition to Nakasuji's, the step of measuring electrons by a detector assembly under a sequential superposition of electron beamlets forming a variable-shaped exposure beam is taught by Kobinata in Col.7/ll.66-67 and Col.8/ll.1-4.

Regarding claim 67, Kobinata's electron source is specifically denoted as an "electron gun" as shown in numeral 11 in Fig.1. As known in the art, electron gun can be used to generate a multiple array of beamlets, if appropriate electron optics and apertures are being used.

Alternatively, Muraki et al. disclose an electron beam exposure apparatus and method that can be used for inspecting Nakasuji's mask by replacing Muraki's wafer 5 shown in Fig.1 by Nakasuji's mask 75 or Kobinata's mask M. As shown in Fig.1, Muraki's device and method make use of a blanking aperture BA disposed between the beamlet shaping section 3 and the mask 5.

Specifically regarding claim 68, the limitation that the MxN aperture array corresponds to the (first) multi-blanking aperture array is trivial, since otherwise the blanking aperture array will not be able to function properly.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Nakasuji's mask inspecting apparatus by adding a blanking aperture as taught by Kobinata or Muraki et al., since such a blanking aperture would enable one of ordinary skill in the art to compose a variable shape electron beam of any desired form based on a superposition of differently shaped electron beams in timely sequential order, here accomplished by blanking (i.e., deflecting away) the electron beam during every change of shape.

However, Nakasuji's device and method do not make use of a first and second multi-aperture arrays having apertures with a first and second shape, respectively. The use of (at least) two multi-aperture arrays is taught by Itoh et al. in numerals 112 and 116 shown in Fig.1 and Fig.2, as recited in Col.1/ll.56-68 and Col.5/ll.62, respectively. It is also taught by Shimura et al. in apertures 6 and 10 shown in Fig.1, as recited in Col.2/ll.50-68 and Col.3/ll.1-6, and further, by Yasaka et al. in apertures P1 and P2 shown in Fig.1 & 3, as recited in the Constitution section, lines 3-7.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Nakasuji's one aperture array with two multi-aperture arrays, in order to generate an electron beam of variable shapes determined by the intersection of the two apertures, as taught by Itoh et al., Shimura et al., or Yasaka et al.

Further, Muraki et al. make use of a first electron lens group 2 shown in Fig.1 to direct electrons from the source 1 into a collimated beam in an axial direction AX towards the first multi-aperture array 3, the latter being here modified by Nakasuji's beam shaper 71 according to Muraki's teaching in Col.6/II.61-64 regarding the equivalence between crossover image and electron source. Muraki's modification of Nakasuji's device and method also make use of a second electron lens group 41 to direct each beamlet formed by the first multi-aperture array 3 (implicated in Col.7/II.8-13) towards the center of Itoh's or Shimura's or Yasaka's second aperture (as modified by Nakasuji into a multi-aperture array) placed at Muraki's cross-over image shown Fig.1 between lens 43 and lens 44.

Muraki's modification of Nakasuji's device and method further make use of an electron deflector 6 disposed between the first multi-aperture array 3 and the second multi-aperture array placed at Muraki's cross-over image between lens 43 and lens 44.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to dispose Muraki's electron deflector 6 between the first multi-aperture array 3 and the second multi-aperture array at Muraki's crossover image between lens 43 and lens 44, as modified above by Nakasuji into a second multi-aperture array, since this arrangement is conventional in the art, as disclosed by Itoh et

al. in electron deflector 114 disposed between first aperture 112 and second aperture 116, both apertures having been modified from single apertures to multiple aperture arrays according to Nakasuji's teaching.

21. Regarding claims 50 and 125, Muraki's aperture BA in Fig.1 may be formed as an active blanking aperture array having M rows and N columns, as implicated in Col.9/II.8-11 by analogy to previously recited electron beamlets 305 and 306 shown in Fig.3 and recited in Col.9/1-8. Alternatively, Muraki's aperture BA is modified by general knowledge in the art into a multiple blanking aperture in order to match the first multi-aperture array of Nakasuji's.

22. Regarding claim 51, Nakasuji's as modified by Muraki's blanking aperture array BA in Muraki's Fig.1 may be alternatively switched in position with the second multi-aperture array of claim 49 or 124 at the crossover image between lens 43 and lens 44, without any effect on the function of the electron exposure device, as generally known in the art. Under this alternative arrangement, Muraki's modification of Nakasuji's device & method further make use of a third electron lens group 43 to direct each beamlet having selected shapes towards a corresponding aperture in the blanking aperture array, now placed between 43 and 44.

The limitations of a logic circuit associated with the blanking aperture and a contrast aperture to absorb unwanted electrons and x-rays are both conventional and well known in the art, and hence, unpatentable.

Nakasuji's as modified by Kobinata's and Muraki's further makes use of a fourth electron lens group 44 to focus the electron beamlets passing undeflected through the blanking aperture array (located between lens 43 and 44) onto the mask 5 (modifying Nakasuji's multi-aperture array 75 of Fig.11).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to switch Muraki's blanking aperture array BA in Fig.1 with the second multi-aperture array at the crossover image between lens 43 and lens 44, since it has been held that a mere reversal of the essential working parts of a device without producing any novel or unexpected results involves only routine skill in the art. *In re Einstein*, 8 USPQ 167.

23. Claim 126 is a method claim version of claim 51. Consequently, claim 126 is also rejected along with claim 51.

24. Claims 52-59 & 69-72 (device claims) and 127-134 (method claims) are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakasuji in view of Kobinata and Muraki et al., and further in view of Itoh et al., or Shimura et al., or Yasaka et al., as previously applied to the respective parent claims 49, 51 and 126.

► Claims 52, 54, 56, 58 (device claims) and 127, 129, 131, 133 (method claims) are also rejected under 35 U.S.C. 103(a) as being unpatentable over Nakasuji in view of Kobinata and Muraki et al., and further in view of Itoh et al., or Shimura et al., or Yasaka et al., as previously applied to the respective parent claims (51 and 126) for reciting the

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same limitations as claims 51 and 126, respectively, only with the positions of the first, second and the blanking multi-aperture arrays exchanged.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to switch the positions of the first, second and the blanking aperture arrays in various sequential orders, since it has been held that a mere reversal or rearrangement of the essential working parts of a device without producing any novel or unexpected results involves only routine skill in the art. *In re Einstein*, 8 USPQ 167.

► Claims 53, 55, 57, 59 and 128, 130, 132, 134 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakasuji in view of Kobinata and Muraki et al., and further in view of Itoh et al., or Shimura et al., or Yasaka et al., as previously applied to the respective parent claims 51 and 126.

It is generally known in the art that low atomic number materials are poor x-ray scatterers, whereas high atomic number materials are strong x-ray scatterers. To make an x-ray scattering mask using both low and high atomic number materials is therefore conventional and also well known in the art.

► Claim 69 recites the same limitations as claim 83, except for a dependency on claim 49 instead of claim 77. Claim 69 is therefore rejected by for same reason as claim 83, but over the prior arts of Nakasuji in view of Kobinata and Muraki et al., and further in view of Itoh et al., or Shimura et al., or Yasaka et al., as previously applied to its parent claim 49.

► Claims 70-72 recite the same limitations as claims 114-116, except for a dependency on claim 69 instead of claim 102. Claims 70-72 are therefore rejected by

for same reason as claims 114-116, but over the prior arts of Nakasuji in view of Kobinata and Muraki et al., and further in view of Itoh et al., or Shimura et al., or Yasaka et al., as previously applied to its parent claim 69.

25. Claims 60, 61, 135 and 136 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakasuji in view of Kobinata and Muraki et al., and further in view of Itoh et al., or Shimura et al., or Yasaka et al., as previously applied to the respective parent claims 59 and 134, for reciting limitations that are conventional and also well known in the art.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use at least one x-ray baffle in order to prevent unwanted x-ray generated in the aperture materials by high energy electrons from producing secondary electrons that may reach the electron detectors and falsify the measurement data.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to dispose the x-ray baffle between the second multi-aperture array and the active blanking aperture array, since it is just the conventional position that would render the baffle function most effective, as generally known in the art.

26. Claim 62 recites specific limitations regarding the fourth electron lens group being constructed of first and second symmetric magnetic doublets, the limitations being conventional as also well known in the art, and hence, unpatentable. Further limitations

of their relative locations is -- apart from the design being uncritical -- also conventional and well known in the art, and hence, unpatentable.

27. Claims 63 and 65 recite limitations that are uncritical, and furthermore, are mere matters of design choice. As such, claims 63 and 65 are both unpatentable.

28. Claim 64 recites limitations which consist of a combination of claims 49 and 63. Claim 64 is therefore unpatentable by the same token as previously applied to claims 49 and 63.

29. Claim 66 recites a memory unit for storing a next pattern logic, which is conventional, and hence, unpatentable.

30. Claims 73-76 and 140-143 are various types of claims, such as product by process, apparatus for process and object for process claims, reciting limitations which are directly or indirectly dependent to, while being fully covered in its entirety without a single exception by the limitations of the parent apparatus claim 49 and the method claim 124, respectively. Claims 73-76 and 140-143 are therefore rejected along with claims 49 and 124.

31. Claim 137 is a method claim version of claim 62, and hence, is unpatentable by the same token.

32. Claim 138 is a method claim version of claim 63, and hence, is unpatentable by the same token.

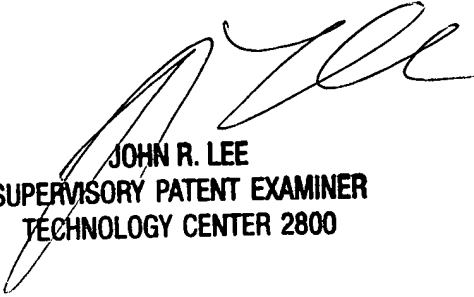
33. Claim 139 is a method claim version of claim 66, and hence, is unpatentable by the same token.

34. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard E Souw whose telephone number is 703 305 0149. The examiner can normally be reached on Monday thru Friday, 9:00 am to 5:00 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R Lee can be reached on 703 308 4116. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9318 for regular communications and 703 872 9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.

bes
October 18, 2002



JOHN R. LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800